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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/652,489	09/02/2003	In-Su Hwang	1349.1259	2307

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EXAMINER	
MRUK, GEOFFREY S	

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 01/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/652,489	HWANG, IN-SU	
	Examiner	Art Unit	
	Geoffrey Mruk	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 15 November 2005 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 2, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 5,689,290) in view of Chuang et al. (US 5,708,957).

With respect to claim 1, the primary reference of Saito discloses an ink-detecting device (Fig. 3) of an inkjet printer (Fig. 1), to detect an ink level and to detect when the ink level decreases below a predetermined level, (Column 5, lines 32-48) comprising:

- an ink tank (Fig. 3, element 11) comprising a predetermined amount of ink;

- a supporting member disposed adjacent to an interior surface of the ink tank;
- a luminous member (Fig. 3, element 34) comprising a self-luminous material and supported by the supporting member, and
- a photo detector (Fig. 3, element 35) to detect a light (Fig. 3, element C) emitted from the luminous member when the ink level in the ink tank is lower than the predetermined level. Although the supporting member is not disclosed to support the light emitting diode (Fig. 3, element 34), this supporting member adjacent to elements 36 and 37 of Figure 3 would necessarily be present in order to hold the light emitting diode.

With respect to claim 2, the primary reference of Saito discloses a transparent window (Fig. 3, elements 30 and 31) disposed at a corresponding position of the supporting member to pass the light (Fig. 3, element C) from the luminous member (Fig. 3, element 34), wherein the photo detector detects (Fig. 3, element 35) the light passed through the transparent window.

With respect to claim 5, the primary reference of Saito discloses the supporting member is disposed at a sidewall (Fig. 3, element 22) of the ink tank (Fig. 3, element 11). Although the supporting member is not disclosed to support the light emitting diode (Fig. 3, element 34), this supporting member adjacent to elements 36 and 37 of Figure 3 would necessarily be present in order to hold the light emitting diode.

With respect to claim 6, the primary reference of Saito discloses the supporting member is disposed at a bottom (Fig. 3, element 22) of the ink tank (Fig. 3, element 11).

Since the diode (Fig. 3, element 34) is disposed at a bottom of the tank, the support for the diode would necessarily be present at the bottom of the tank.

However, Saito fails to teach the luminous member being capable of emitting light without using a powered light source.

The secondary reference of Chuang discloses "an optical sensor is provided with a self-powered light source by the use of a radio luminescent material which includes a radioactive beta emitter constituent and a phosphor constituent energized by beta particles from the radioactive constituent to emit light. By appropriate selection of the phosphor compound, the wavelength of light produced by the radio luminescent source may be matched to a corresponding sensing matrix to optimally configure the sensor for the detection of a particular substance of interest" (Column 2, lines 29-39). Figure 1 illustrates the optical system where "A test medium enters test cell 40 along a pathway indicated by arrow 46 and exits the pathway along arrow 48. Test cell wall 42 is configured to permit the transmission of light from optical filter 34 there through. Light also passes through space 45 containing the test medium before encountering sensing matrix 50. For this configuration, the test medium is a gas or liquid, which permits the transmission of light there through" (Column 3, lines 64-67; Column 4, lines 1-2) and the "Sensing matrix 50 produces an optical characteristic which varies with the presence of a selected substance in test cell 50. This varying optical characteristic is represented by arrows 58 and is detected by photo detector 60 through optical filter 64" (Column 4, lines 22-26).

Therefore, in view of the teachings of the secondary reference, one of ordinary skill in the art would have been motivated to modify the primary reference by using the self-powered light source of Chuang in the liquid level detecting mechanism of Saito. The motivation for doing so would have been "Luminophore-based sensors typically use a LED or lamp as a light source, requiring an external power supply which can add noise and variability to sensor operation due to variations in the supply power. Where the power supply has a limited life, such as when batteries are used as the power source, the operation of the sensor is limited by the operational lifetime of the power supply" (Column 1, lines 60-66).

2. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 5,689,290) in view of Chuang et al. (US 5,708,957) as applied to claims 1, 2, 5, and 6 above, and further in view of Kitagawa et al. (US 6,264,855 B1).

Saito and Chuang references disclose all of the limitations of the ink-detecting device of an inkjet printer except:

- the luminous member is a luminous paper and
- the luminous member is a luminous paint.

Kitagawa discloses a water resistant luminous pigment where "this pigment is homogeneously dispersed in each kind of ink vehicle, paint vehicle or the like to give a luminous ink or a luminous paint. Using this ink or paint, luminous patterns, letters, figures or the like can be formed or further a luminous paint membrane can be applied toward molded products such as paper, monofilament or multifilament fibers, knitted or woven fabric, nonwoven fabric, synthetic resin film, synthetic resin molded product,

glass molded product, ceramics molded product, leather molded product, metal molded product, wood molded product or the like by a printing method such as a gravure, offset, screen or tampo printings, or by a coating method such as a brush painting, hazing painting, dipping, roll coating, knife coating, shower coating or spray coating" (Column 6, lines 42-57).

Therefore, in view of the teachings of the tertiary reference, one of ordinary skill in the art would have been motivated to modify the primary reference by using the water resistant luminous pigment of Kitagawa in the liquid level detecting mechanism of Saito. The motivation for doing so would have been "it is a luminous pigment able to emit light in a dark place for long time and also has a very excellent water resistance" (Column 6, lines 36-38).

3. Claims 7 and 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 5,689,290) in view of Chuang et al. (US 5,708,957).

With respect to claim 7, the primary reference of Saito discloses an inkjet printer (Fig. 1) comprising an ink level-detecting device (Fig. 3), the inkjet printer comprising:

- a photo detector (Fig. 3, element 35); and
- an ink level detecting device detecting an amount of residual ink in the printer using the photo detector (Column 5, lines 32-48), and
- comprising a luminous member (Fig. 3, element 34) to detect when a level of ink is lower than a predetermined level during a printing operation.

With respect to claim 10, the primary reference of Saito discloses the ink level-detecting device (Fig. 3) comprises:

- an ink tank (Fig. 3, element 11) comprising a liquid carrier and a toner used as a developer for the inkjet printer. The toner would necessarily be present in the liquid carrier since ink has carrier and colorant (Column 1, lines 58-59).
- a supporting member disposed at a sidewall of the ink tank to detect when the ink is low. Although the supporting member is not disclosed to support the light emitting diode (Fig. 3, element 34), this supporting member adjacent to elements 36 and 37 of Figure 3 would necessarily be present in order to hold the light emitting diode.
- a transparent window (Fig. 3, elements 30 and 31) passing a light (Fig. 3, element C) from the luminous member and disposed at a bottom of the ink tank. Although the supporting member is not disclosed to support the light emitting diode (Fig. 3, element 34), this supporting member would necessarily be present adjacent to elements 30 and 31 of Figure 3 in order to hold the light emitting diode.
- a photo detector (Fig. 3, element 35) detecting the light from the luminous member.

With respect to claim 11, the primary reference of Saito discloses "When the ink level 27 (ink level 26) is above the transparent windows 30, 31, the light ray C will pass through the ink (e.g., black ink), resulting in a smaller quantity of light reaching the phototransistor (light receiving means) 35" (Column 5, lines 32-47). Applicant's claimed invention specifies that when the container is not empty, the sensor cannot detect any light passing through the ink. Saito teaches that a certain amount of light is needed to

trigger the phototransistor. Therefore, Saito renders obvious the claimed invention, since light needed to trigger the phototransistor is equivalent to the claimed "detecting" mechanism.

With respect to claim 12, the primary reference of Saito discloses when the tank is not full, the ink level is under the transparent window and the light emitted from the luminous member passes through the transparent window (Column 5, lines 32-47).

With respect to claim 13, the primary reference of Saito discloses the ink level-detecting device comprises:

- an ink tank (Fig. 3, element 11) comprising a liquid carrier and a toner used as a developer for the inkjet printer. The toner would necessarily be present in the liquid carrier since ink has carrier and colorant (Column 1, lines 58-59).
- a supporting member disposed at the bottom of the ink tank to detect when the ink is low. Although the supporting member is not disclosed to support the light emitting diode (Fig. 3, element 34), this supporting member adjacent to elements 36 and 37 of Figure 3 would necessarily be present in order to hold the light emitting diode.
- a transparent window (Fig. 3, elements 30 and 31) passing a light (Fig. 3, element C) from the luminous member (Fig. 3, element 34) and disposed at a sidewall of the ink tank, and
- a photo detector (Fig. 3, element 35) detecting the light from the luminous member.

However, Saito fails to teach the luminous member comprises a self-luminous material.

The secondary reference of Chuang discloses "an optical sensor is provided with a self-powered light source by the use of a radio luminescent material which includes a radioactive beta emitter constituent and a phosphor constituent energized by beta particles from the radioactive constituent to emit light. By appropriate selection of the phosphor compound, the wavelength of light produced by the radio luminescent source may be matched to a corresponding sensing matrix to optimally configure the sensor for the detection of a particular substance of interest" (Column 2, lines 29-39). Figure 1 illustrates the optical system where "A test medium enters test cell 40 along a pathway indicated by arrow 46 and exits the pathway along arrow 48. Test cell wall 42 is configured to permit the transmission of light from optical filter 34 there through. Light also passes through space 45 containing the test medium before encountering sensing matrix 50. For this configuration, the test medium is a gas or liquid, which permits the transmission of light there through" (Column 3, lines 64-67; Column 4, lines 1-2) and the "Sensing matrix 50 produces an optical characteristic which varies with the presence of a selected substance in test cell 50. This varying optical characteristic is represented by arrows 58 and is detected by photo detector 60 through optical filter 64" (Column 4, lines 22-26).

Therefore, in view of the teachings of the secondary reference, one of ordinary skill in the art would have been motivated to modify the primary reference by using the self-powered light source of Chuang in the liquid level detecting mechanism of Saito. The

motivation for doing so would have been "Luminophore-based sensors typically use a LED or lamp as a light source, requiring an external power supply which can add noise and variability to sensor operation due to variations in the supply power. Where the power supply has a limited life, such as when batteries are used as the power source, the operation of the sensor is limited by the operational lifetime of the power supply" (Column 1, lines 60-66).

4. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 5,689,290) in view of Chuang et al. (US 5,708,957) as applied to claims 7 and 10-13 above, and further in view of Denton et al. (US 6,293,143 B1).

Saito and Chuang references disclose all of the limitations of the ink-detecting device of an inkjet printer except:

- a controller controlling operations of the inkjet printer and outputting a signal indicative that the level of ink is lower than the predetermined level to an output device and
- the output device comprises a display.

Denton discloses "a digital signal is generated as a result of the output change and is relayed to the printer control to signal a low ink level alarm. The alarm may be an audible signal, a visible signal, a message displayed on a computer monitor or a combination of signals and/or messages. In the alternative, the digital signal generated by the photo sensor 38 may also be used to terminate printing operations upon activation of the low level alarm" (column 4, lines 56-65).

Therefore, in view of the teachings of the tertiary reference, one of ordinary skill in the art would have been motivated to modify the primary reference by using the display indications for low ink level of Denton in the liquid level detecting mechanism of Saito. The motivation for doing so would have been to easily alert a user of the printer when the liquid level within the ink tank is low.

5. Claims 14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 5,689,290) in view of Chuang et al. (US 5,708,957).

With respect to claim 14, the primary reference of Saito discloses an ink-detecting device (Fig. 3) of an inkjet printer (Fig. 1), comprising: a luminous member (Fig. 3, element 34) to detect when a level of ink is lower than a predetermined level during a printing operation (Column 5, lines 32-48).

With respect to claim 16, the primary reference of Saito discloses an ink-detecting device of an inkjet printer, comprising: a luminous member to detect a level of ink.

However, Saito fails to teach the luminous member is capable of emitting light without using a powered light source.

The secondary reference of Chuang discloses "an optical sensor is provided with a self-powered light source by the use of a radio luminescent material which includes a radioactive beta emitter constituent and a phosphor constituent energized by beta particles from the radioactive constituent to emit light. By appropriate selection of the phosphor compound, the wavelength of light produced by the radio luminescent source may be matched to a corresponding sensing matrix to optimally configure the sensor for

the detection of a particular substance of interest" (Column 2, lines 29-39). Figure 1 illustrates the optical system where "A test medium enters test cell 40 along a pathway indicated by arrow 46 and exits the pathway along arrow 48. Test cell wall 42 is configured to permit the transmission of light from optical filter 34 there through. Light also passes through space 45 containing the test medium before encountering sensing matrix 50. For this configuration, the test medium is a gas or liquid, which permits the transmission of light there through" (Column 3, lines 64-67; Column 4, lines 1-2) and the "Sensing matrix 50 produces an optical characteristic which varies with the presence of a selected substance in test cell 50. This varying optical characteristic is represented by arrows 58 and is detected by photo detector 60 through optical filter 64" (Column 4, lines 22-26).

Therefore, in view of the teachings of the secondary reference, one of ordinary skill in the art would have been motivated to modify the primary reference by using the self-powered light source of Chuang in the liquid level detecting mechanism of Saito. The motivation for doing so would have been "Luminophore-based sensors typically use a LED or lamp as a light source, requiring an external power supply which can add noise and variability to sensor operation due to variations in the supply power. Where the power supply has a limited life, such as when batteries are used as the power source, the operation of the sensor is limited by the operational lifetime of the power supply" (Column 1, lines 60-66).

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. (US 5,689,290) in view of Chuang et al. (US 5,708,957) as applied to claims 1, 2, 5, and 6 above, and further in view of Kitagawa et al. (US 6,264,855 B1).

Saito and Chuang references disclose all of the limitations of the ink-detecting device of an inkjet printer except: the luminous member is a luminous paper.

Kitagawa discloses a water resistant luminous pigment where "this pigment is homogeneously dispersed in each kind of ink vehicle, paint vehicle or the like to give a luminous ink or a luminous paint. Using this ink or paint, luminous patterns, letters, figures or the like can be formed or further a luminous paint membrane can be applied toward molded products such as paper, monofilament or multifilament fibers, knitted or woven fabric, nonwoven fabric, synthetic resin film, synthetic resin molded product, glass molded product, ceramics molded product, leather molded product, metal molded product, wood molded product or the like by a printing method such as a gravure, offset, screen or tampo printings, or by a coating method such as a brush painting, hazing painting, dipping, roll coating, knife coating, shower coating or spray coating" (Column 6, lines 42-57).

Therefore, in view of the teachings of the tertiary reference, one of ordinary skill in the art would have been motivated to modify the primary reference by using the water resistant luminous pigment of Kitagawa in the liquid level detecting mechanism of Saito. The motivation for doing so would have been "it is a luminous pigment able to emit light in a dark place for long time and also has a very excellent water resistance" (Column 6, lines 36-38).

Response to Arguments

Applicant's arguments filed 16 September 2005 have been fully considered but they are not persuasive. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., Figure 2, element 13 – the support member being positioned inside the ink tank) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Chuang discloses, "Sensing matrix 50 produces an optical characteristic which varies with the presence of a selected substance in test cell 50. This varying optical characteristic is represented by arrows 58 and is detected by photodetector 60 through optical filter 64" (Column 4, lines 22-26).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey Mruk whose telephone number is 571 272-2810. The examiner can normally be reached on 7am - 330pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GSM
1/12/2006

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MANISH S. SHAH
PRIMARY EXAMINER